THIS MANUAL FOR Engr Eff Lab STARC #2

INSTRUCTION MANUAL

MARKA-SWEEP MODEL VIDEO 100

KAY ELECTRIC CO.
PINE BROOK, N. J.

INSTRUCTION MANUAL

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Issue A

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MARKA-SWEEP

MODEL VIDEO 100

Catalog No. 154-A

SWEEPING OSCILLATOR

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MARKA-SWEEP MODEL VIDEO 100

INTRODUCTION

The Marka-Sweep Model Video 100 is an all-electronic sweeping oscillator, using all solid-state components. Beat-frequency oscillator techniques are used to provide continuously tuned center frequencies from 50 kc to 100 mc. Sweep width is continuously adjustable from 100 kc to 100 mc. A manually-controlled swept output covering the same range permits detailed examination of response characteristics of the circuit or device being tested. The instrument may also be operated as a calibrated c-w generator.

Both the center frequency of the swept output, and the frequency of the c-w output, are selectable by a digital readout dial. Output is metered and variable up to 1 volt rms into 50 ohms (70 ohms on request), and is stabilized by fast-acting agc circuits to within ± 0.25 db over widest sweep. Up to six pulse-type, crystal positioned markers may be specified. Variable 'birdie' type marker(s) can be developed, through the use of external oscillator(s) to denote specific frequency(s) on the developed response curve. A built-in detector and precision step-attenuator add to the versatility of the instrument.

The Marka-Sweep is designed for bench-top operation and is self-contained, including the low-voltage power supply.

EQUIPMENT SUPPLIED

The Marka-Sweep Model Video 100 is shipped complete with metal cabinet and built-in power supply. Other auxiliary equipment and interconnecting cables referred to in this manual are not furnished.

GENERAL INSTRUCTIONS

As soon as the Marka-Sweep is received, it should be visually inspected to determine that the instrument was not damaged during shipment. A careful check of packing case contents should be made to insure removal of all items shipped. Shortage or damage, should be reported immediately to the carrier and Kay Electric Company, or its representative in the area.

INSTALLATION

The operating area selected should be as free as possible from vibration, due to the presence of operating machinery, or other sources of vibration. Extreme variations of ambient temperature should also be avoided. Sufficient space should be alloted to avoid obstruction of the ventilating louvers. Observation of these precautions will result in the user realizing optimum performance of the equipment.

SPECIFICATIONS: Marka-Sweep Model Video 100

Frequency Range:	50 kc to 100 mc, continuously tuned.
RF Output:	1V rms into 50 ohms, metered. (70 ohms on request)
Flatness:	± 0.25 db over widest sweep.
Sweep Width:	Continuously variable from 100 kc to 100 mc. CW operation.
CW Digital Dial Accuracy:	± 0.5 mc.
Rep Rate:	Locks to line frequency, or variable from 5 to 60 rps. Manual sweep.
Sweep Output: (CRO SWEEP)	Sawtooth, synchronized with sweeping oscillator; approx. 12V p-p output.
Zero Reference:	Zero-voltage baseline developed during CRO retrace time; on-off switch.
Attenuator:	20, 20, 20, 10, 6 and 3 db, plus 3 db variable.
Markers:	Up to 6 crystal controlled pulse-type markers (available at Detector Out jack and at separate PIP output jack, permits use of marker by-pass system). Provision for birdie bypass markers derived from external oscillator(s).
Detector:	Built-in detector.
External Modulation:	The modulation signal can be from dc to 15 kc. Two volts p-p about zero will give full 100-mc sweep.
Power Requirements:	Input approx. 20w, 117v (±10%), 50-60 cps; regulated.
Physical Data:	Dimensions- 8" x 19.5 x 13.5 Weight- 28 lbs.

FUNCTION OF CONTROLS AND TERMINALS

CONTROL	POSITION	FUNCTION
PWR ON-OFF Switch	ON-OFF	This switch controls input power to the instrument.
FUNCTION SELECTOR Switch	5 positions-	
	EXT MOD	In this position, an externally provided signal may be used to modulate the sweep oscillator output.
	CW	A c-w signal, variable in frequency between 50 kc and 100 mc, is available at the RF 50-ohm Output terminal when the Function Selector is set to CW position.
	MAN SWP	In this position, the Manual Sweep control may be used to vary oscillator frequency, or hold it at any frequency between 50 kc and 100 mc.
	VAR SWP	When the Function Selector is set to VAR SWP position, the Sweep Rate control may be used to vary the rep rate of the sawtooth voltage between 5 and 60 rps.
	LINE LOCK	In this position, the rep rate of the sawtooth voltage is locked at power-line frequency.
CENTER FREQUENCY (Megacycles) Dial	Digital Readout	The digital readout dial indicates center frequency of the swept r-f output, or the frequency of the c-w output.
ZERO ADJ Control	Variable	This is a vernier control for calibrating the digital readout dial.
SWEEP RATE	Variable	The rep rate of the sawtooth voltage can be varied from 5 to 60 rps by adjusting this control (when the Function Selector is set to Var Swp).
SWEEP WIDTH Control	Variable	This control is used to vary the width or range of the frequency sweep.
X1 - X0.1 Switch	X1	In this position, the sweep width can be varied between 100 kc and 100 mc by adjusting the Sweep Width control.
	X0.1	In this position, sweep width can be adjusted between 100 kc and 10 mc.

(Function of Controls and Terminals Continued)

CONTROL	POSITION	FUNCTION
MANUAL SWEEP Control	Variable	When the Function Selector is set to Man Swp position, this control may be used to vary the frequency of the swept r-f signal manually.
RF LEVEL Control	Variable	This control provides 3 db of variable attenuation, in addition to the stepped attenuation.
BLANKING ON Switch	ON - OFF	When this switch is set to the On position, the sweep oscillator is blanked during CRO retrace time, producing a zero-voltage baseline on the scope. In the Off position, the CRO traces a response curve in both the forward and reverse directions.
ATTENUATOR	Stepped, 20, 20, 20, 10, 6, 3 db.	These toggle switches permit insertion of additive, stepped attenuation.
PIP ADJ	Variable	This control is properly adjusted when all the pulse markers remain stable during the operating sweep rate and width.
PIP LEVEL	Variable	The pip level at both the Pip Out and Vert jacks is adjustable with this control.
PIP SWP ADJ	Variable (Stepped)	This control is adjustable for stable, clean pips for the desired sweep width and rate.
MARKER SWITCHES	ON - OFF	Each of these toggle switches controls one of the six crystal-controlled pulse-type markers (Customer selected). When any switch is set to the On (up) position, the corresponding marker circuit is energized, producing a pip at the crystal frequency. This marker pip is available at the Pip Out jack, and at the Vert jack. Pip amplitude at the Pip Out jack may be adjusted as high as 8 volts peak.

INPUT AND OUTPUT TERMINALS

TERMINAL	FUNCTION
VERT Output Jack	The detected swept output and the pulse and birdie markers are available at this jack. The output is normally applied to the Y-input on the CRO.
RF 50-OHM OUTPUT Jack	The swept rf output is available at this jack.
DETECTOR Input Jack	This is the detector input terminal.
HORIZ or EXT MOD Jack	When the Function Selector is set to either Man Swp, Var Swp or Line Lock, a voltage is available at this jack (sawtooth in Var Swp and Line Lock positions), and is normally used tc drive the X-axis amplifiers in the CRO. During c-w operation, there is no output at this jack. When the Function Selector is set to Ext Mod position, an externally supplied signal may be used to replace the internally generated sawtooth voltage.
MARKER INPUT Jack	This is the marker input terminal, into which c-w signals may be fed to develop variable markers. (Fig. 1).

OPERATION

The block diagram in Fig. 1 shows typical interconnection of the Marka-Sweep and associated equipment. Incorporation of the impedance matching devices in the test set-up will depend on the requirements of the circuit being tested, however, proper impedance match between equipment is very important.

1. Turn the equipment on and allow a few minutes warm-up time to stabilize the circuits.

2. Set the Function Selector for the desired mode of operation. (For this checkout of controls, set the Function Selector to Line Lock position.)

3. Set the Center Frequency dial to the desired center frequency, and adjust the CRO controls for an on-screen trace. (The CRO internal sweep is not used.)

4. Adjust the sweep width X1 - XO.1 switch and the Sweep Width control for a sweep compatible with the passband of the device being tested.

5. Adjust the RF Level control (and the CRO Y-axis gain controls) for a trace of convenient height. Insert fixed attenuation as required.

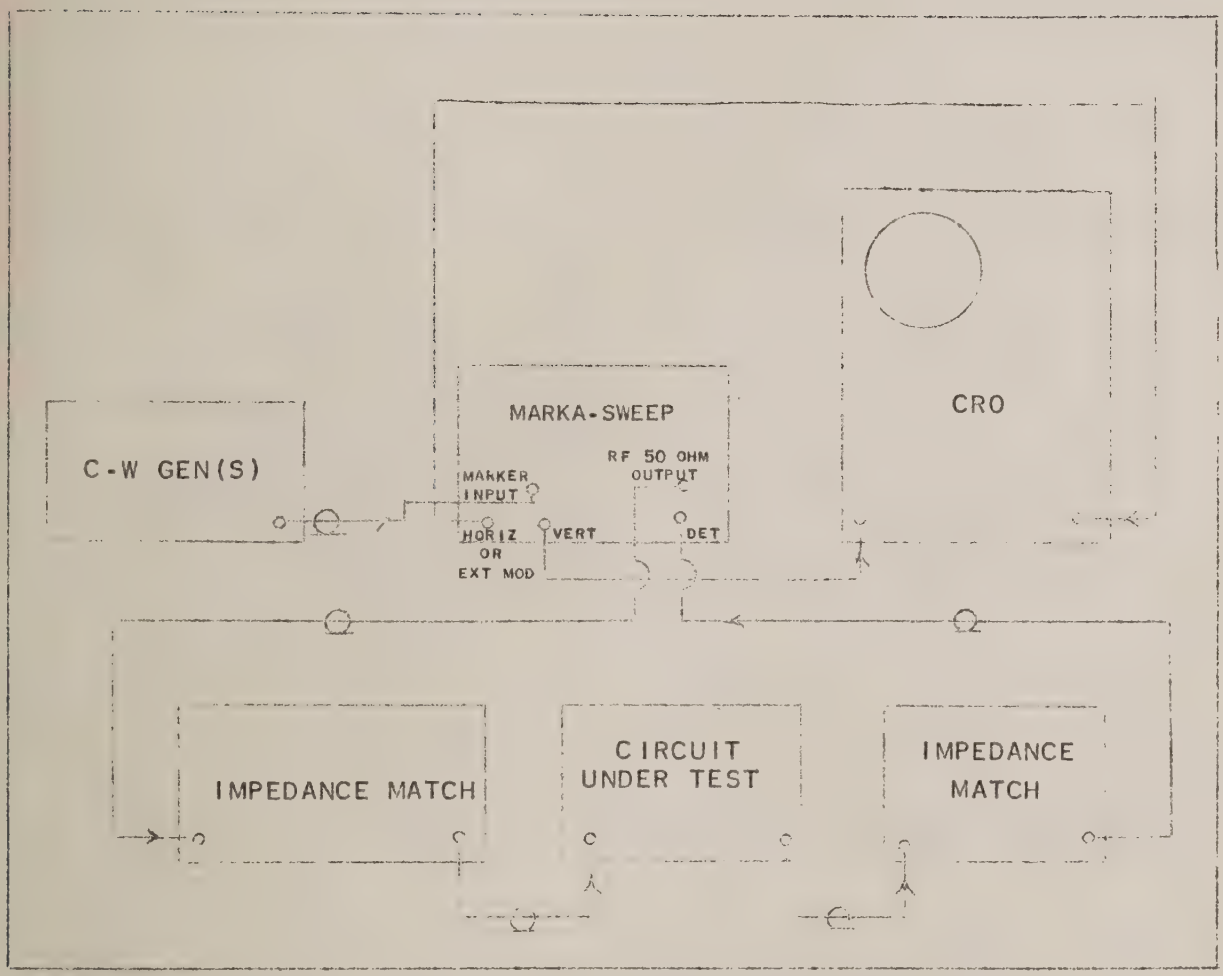

Fig. 1, Typical interconnection of Marka-Sweep Model Video 100 and associated equipment.

6. To check or reset the calibration of the Center Frequency dial, set the dial to 0 mc and vary the Zero Adj control to position the zero beat at the center of the CRO display. (Use narrowest sweep width.)

7. Set the Function Selector to Var Swp position and adjust the Swp Rate control between 5 and 60 rps.

8. Fixed-frequency markers may be superimposed on the response curve seen on the CRO screen, by setting appropriate Marker switches to the On (up) position. To adjust for stable, clean marker pips, adjust panel controls as follows-

   a. Set the Pip Level control to mid-range.

   b. Vary the Pip Adj control for minimum multiple firing.

   c. Set the Pip Sweep Adj control to that position which is most compatible with the sweep width and rate being used, as evidenced by stable, clean marker pips.

   d. The Pip Level control may now be readjusted for desired pip amplitude.

9. To use the variable marker, apply power to the c-w generator and set its tuning dial for an output frequency within the range of the r-f sweep. Adjust the c-w generator r-f output level until a marker is observed on the CRO trace. The marker may be moved across the trace by changing the output frequency of the c-w generator. Marker frequency is read directly from the tuning dial of the c-w generator.

   A second variable marker may be produced by using a second c-w generator and applying its output through a 'T' connector to the Marker Input jack.

10. Set the Blanking On switch to the off position. It will be noted that now there is no baseline developed on the CRO screen, and that both a forward and reverse sweep trace is developed.

11. Set the Function Selector to Man Swp position and vary the Manual Sweep control. It should be possible to manually sweep the same frequency range as the automatic sweep.

12. Set the Function Selector to Ext. Mod position, and connect the output of an external generator, such as a sine-wave generator, sawtooth voltage generator, etc., to the Horiz Ext Mod jack and to the CRO X-axis input terminal (2v p-p for full 100 mc sweep). The externally supplied signal will now replace the internally generated sawtooth voltage and the sweep oscillator will be modulated accordingly.

SWEEP VOLTAGE GENERATOR

SWEEP LINEARITY NETWORK

BLANKING AMPL

LINE LOCK PULSE GEN

S3 FUNCTION SELECTOR

375 - 425MC OSC

325 - 375MC OSC

VOLTAGE VARIABLE ATTENUATOR

MIXER

RF AMPLIFIER

AGC AMPL

BIRDIE MARKER AMPL

BUFFER AMPL

SWEEP VOLTAGE AMPL

ATTENUATOR

XTAL MARKERS

DETECTOR

PIP GEN

XTAL MARKER AMPL

NOTE
UNLESS INDICATED OTHERWISE
ALL CAPACITANCES ARE IN $\mu\mu f$
ALL RESISTANCES ARE IN OHMS 1/2W EXCEPT SHIELDED SECTIONS 1/4W
ALL FEED THRU CAPACITORS 4000 $\mu\mu f$
*FACTORY SELECTED

SCHEMATIC MARKA-SWEEP MODEL VIDEO 100 154A			
MAT.	FINISH:		SCALE:
DIMENSION TOLERANCES UNLESS OTHERWISE SPECIFIED. DECIMAL DIMENSIONS ± .005 FRACTIONAL DIMENSIONS ± 1/64		KAY ELECTRIC CO PINE BROOK, N. J.	
CHANGE	DATE APP.	DWN. BY A W PIERCE	DATE 9-12-
		APP. BY W. TANIS	DATE 9-12-
		DWG. NO. D8032 A	